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October 25, 2000

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Ms. Magalie R. Salas, Secretary
Federal Communications Commission
The Portals, 445 12th Street, S.W.
Washington, D.C. 20554

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

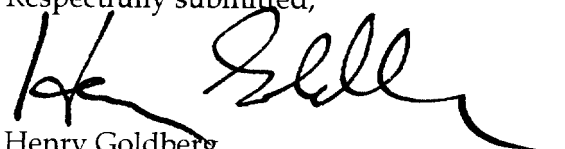
Re: ET Docket 98-153
Revision of Part 15 of the Commission's
Rules Regarding Ultra-Wideband
Transmission Systems
Ex Parte Filing

Dear Ms. Salas:

Roberto Aiello, James Lovette and Eric Macris of Fantasma Networks, Saul Zales and Peter Pitsch of Intel Corporation, and Henry Goldberg of this firm, met with Commissioner Furchtgott-Roth and Bryan Tramont on October 24, 2000 to discuss Fantasma's position in the above referenced proceeding. The Fantasma position is reflected fully in its comments submitted on September 12, 2000. In addition the attached documents, providing a corporate overview of Fantasma, frequently asked questions and an ultra-wideband technology information sheet were given to Bryan Tramont.

If there are any questions in this regard, please contact the undersigned.

Respectfully submitted,


Henry Goldberg
Attorney for Fantasma Networks

Attachments

cc: Commissioner Furchtgott-Roth
Bryan Tramont
Saul Zales
Peter Pitsch

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Company Overview

Fantasma Networks Inc., a privately-held company, was founded in January 2000 by a world class team of wireless experts. The Company develops and commercializes innovative wireless products and services based on ultra-wideband (UWB) technology.

The Company completed its first round of funding with investments from APV Technology Partners, Centennial Ventures, Intel Capital, and Vulcan Ventures (the investment organization of Paul G. Allen) to develop Fantasma's innovative wireless products and services and establish itself as the premier enabler of low-cost, high performance broadband connectivity for the wireless web marketplace.

Market Overview

Increased mobility and dependency on Internet resources, together with a demand for the same high-speed access now familiar at home and office are driving the demand for high speed wireless Web browsing, e-commerce and e-mail messaging. Barriers to achieve success in this high-speed wireless marketplace have traditionally been driven by scarce spectrum capacity and technical hurdles prohibiting the high data rates required by web-based applications. Fantasma engineers have created a platform for wireless products and services based on a patent pending UWB technology designed to extend the reach of the Internet and unleash the revenue potential of wireless web-based services. In recent years, Fantasma's UWB technology has emerged as a high data rate, efficient use of scarce spectrum resources. So much so, that the FCC has opened the door to companies hoping to commercialize the use of this spectrum¹. For several years, Fantasma has been one of a handful of companies actively developing and testing receivers for this spectrum, and more importantly, the only company to test and demonstrate UWB wireless web networks.

All the critical business factors - market demand, technology performance, regulatory approval, industry standards, and the support of major consumer electronics manufacturers and distributors - are coming together under a common belief that enabling wireless Internet access will drive new sources of revenue. **Fantasma** is prepared to leverage its three-year head start for commercial benefit in the wireless web marketplace.

Product Strategy

Fantasma Networks Inc. designs, develops and markets advanced wireless broadband wireless products and services, optimized for indoors, ideal for data and media distribution in homes, retail environments and schools. The Company's business strategy is to license chipsets to OEM partners and provide value-added solutions such as Wireless Web services. **Fantasma's** core chipset technology allows original equipment manufacturers of CE products to build a highly scalable wireless handsets.

¹ Action by the Federal Communications Commission May 10, 2000, by Notice of Proposed Rulemaking (FCC 00-163)

internet appliances and receivers. Fantasma's wireless web solution will allow customer's to configure and transmit high-speed data, multimedia and video from a centralized Internet Protocol platform to multiple wireless client devices simultaneously.

Management Team

Dr. Roberto Aiello, President and CEO

Fantasma's technology has been incubated under Roberto's leadership since 1996. During his tenure at Interval Research, Roberto led the development of the first UWB wireless network that connects consumer devices. Prior to Interval, Roberto held senior positions at the Stanford Linear Accelerator Center (SLAC) and Superconducting Super Collider Laboratory in Texas. Previously, he was Visiting Professor at the Arcetri Astrophysics Observatory and worked at Elettra, in Italy. Roberto has patents pending on wireless communication technologies. A member of APS, IEEE, and AAAS, he earned his Doctorate in Physics from the University of Trieste.

Frank Brooks, Jr. -Vice President of Finance & Administration

Frank Brooks brings to Fantasma Network, Inc., a wealth of experience in corporate finance, high technology management, and business development. Prior to joining Fantasma, Frank oversaw strategic business planning and technology forecasting for Interval Research Corporation, Paul Allen's high technology R&D incubator. Frank has served as the president, CEO, and CFO of two pioneering desktop video system development companies. His early career includes positions as Assistant Treasurer for Chase Manhattan Bank and Vice President of Morgan Bank in New York. Mr. Brooks holds a Bachelor of Arts from Washington & Lee University, in Lexington, Virginia. He was a visiting professor of finance and accounting at Columbia University's Graduate School of Business and New York University's Stern School of Business, respectively; and has been a visiting lecturer on money and banking at Harvard University's Graduate School of Business.

Don Burtis, Vice President of Engineering

Don brings a diverse and extensive background in engineering development and product marketing to the Fantasma management team. At Burtis Associates, his Consulting practice, Don successfully introduced engineering process to many high profile Silicon Valley start-ups, bringing focus and discipline to enable timely delivery of products and services. Prior to forming Burtis Associates in 1996, Mr. Burtis created the Corporate Marketing department and served as Vice President of Corporate Marketing at PCSI. Before joining PCSI, Mr. Burtis was Vice President of Strategic Partners at General Magic, where he was responsible for managing the coordination of product positioning and features among the various MagicCap partners. Prior to General Magic, Mr. Burtis founded and managed companies that designed and developed hardware and software products used with computers, notably the Softcard for Microsoft that allowed Z-80 based programs to run on the Apple computer. Mr. Burtis also provided early design and prototyping support to Microsoft for integrating a mouse device into their software operating system. Mr. Burtis studied at Caltech and UCLA and has a B.S. degree in engineering, with a specialization in computer design.

James J. Kubinec, Strategic Technologist

Jim has been in the semiconductor and integrated circuits field for 30 years. Among some of his more recent positions are Vice President Technical Marketing and Applications of Kaveri Networks, President and CEO of Sierra Microsystems, President

of Sierra Design Center, and Manager of VLSI engineering for Mitel Corp. He was, for 9 years, an AMD Fellow working in the Architecture and Advanced Development Group. He has held various positions at AMD including Director of High Speed Networking, and Director of Strategic Development. He holds BSEE Summa Cum Laude from the Rochester Institute of Technology and an MSEE with honors from Stanford University.

Jim Lovette, Director of Strategic Policies

Jim is responsible for Fantasma's activities with government regulatory agencies such as the FCC. Prior to joining Fantasma he was Principal Scientist, Communications Technologies, for Apple Computer, where he achieved several unlicensed-spectrum allocations. Jim's 1991 Data-PCS Petition resulted in the User-PCS and Data-PCS unlicensed bands, and he established WINForum as the primary technical and lobbying force for wireless data. His NII Band Petition resulted in 300 MHz of unlicensed spectrum in the 5 GHz band, requiring only seven months from initial to final FCC actions. He earned a BS in Physics from Davidson College.

Board of Directors

Ronald Foerster, Chairman

As Senior Vice President at Qualcomm, Ron formed QUALCOMM Europe S.A.R.L. in Sophia Antipolis, France where he led the development of products and standards to integrate Qualcomm's CDMA technology with European and Global GSM networks. As Executive Director, Wireless Technology, and Chief Technology Officer for US West, Ron was responsible for strategic planning for next generation cellular and Personal Communications Service (PCS) business opportunities. Ron's leadership resulted in U.S. West's first-in-the-world commitment to deploy CDMA cellular technology. Previous to US West, Ron held officer level positions in development stage high technology companies where he focused his significant talents on engineering management, product development and innovative business and technical strategies. Ron holds a Bachelor of Science in Aeronautical Engineering from the University of Minnesota, Minneapolis, and a Masters Degree and Ph.D in Joint Applied Mechanics/EE from Stanford University.

Peter G. Bodine, Asia Pacific Ventures

General Partner of APV Technology Partners, a \$250 million early stage venture fund backed by leading Global 1000 corporations, Pete's key area of focus is growing early stage Internet and IT companies. He applies the APV network of corporate contacts to help leverage marketing channels and capital revenues for the firm's portfolio companies. Pete is also on the boards of BUYandHOLD.com, Fatbrain.com, iPass, Onepipeline.Com, Sharewave, and 800.Com. He holds a BS from Brigham Young University and an MBA from the University of Utah.

Adam Goldman, Centennial Ventures

Since joining venture capital company Centennial Ventures nine years ago, Adam has specialized in network investments, broadband network consolidation, and Internet service companies. Previously, he was an Associate with Booz, Allen & Hamilton; a Portfolio Manager for WIG, the Pritzker family's investment management firm; and had a seat on the Chicago Board of Trade. He also sits on VIA Net.Works' board and is Exactis.com's Chairman of the Board. Adam holds a BA in Economics and History from Northwestern University and an MBA from Northwestern's J.L. Kellogg Graduate School of Management.

David M. Moore, Vulcan Ventures Inc.

Prior to joining Vulcan Ventures, Paul G. Allen's investment company, Dave was President of Paralex Corporation, which provided technical due diligence for venture capital firms and private investors. He was previously with Microsoft for 16 years, working on many products, including Chart, Commerce Server, Mail, Multiplan, Word, and Works; most recently he was Director of Development. Dave is also on the boards of Confirma and Vulcan's portfolio companies bSquare and Metricon. He holds a BS in Mathematics from the University of Washington.

Dino Vendetti, Vulcan Ventures Inc.

Dino specializes in telecom, data networking, and Internet infrastructure investments for Vulcan Ventures, the investment organization of Paul G. Allen. In addition to his seat on **Fantasma's** board, he represents Vulcan on the boards of Allegiance Telecom, HarvardNet, Northpoint, Sharewave, and Wavtrace. Previously, Dino was a Telecom Analyst at Dain Rausher and also spent 15 years in the wireless communications industry at Metawave Communications, Qualcomm, TRW, and US West. He earned BS and MS degrees in Electrical and Computer Engineering and an MBA at the University of Washington.

A Primer on UWB

UWB has a long history in military applications, with applications in military radar (1942) and covert military communication (1972). Different from most conventional wireless technologies which use a carrier method of signaling, UWB data are encoded in pulses and transmitted across a wide frequency band at low power. Until recently the FCC reserved this low power broad spectrum for government use only and tolerated unintentional noise transmissions. The FCC recently

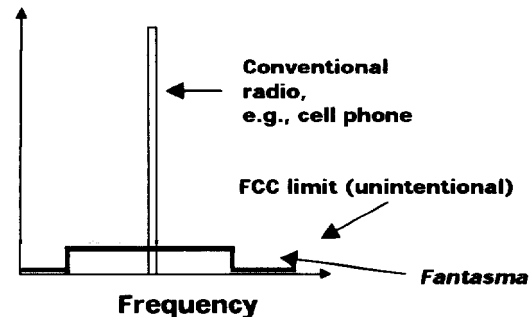


Figure 1 – Comparison of *Fantasma* approach to Conventional Wireless

announced that it has adopted a proposal to consider permitting the operation of UWB technology on an unlicensed basis and that it considers high-speed data transmissions and broadband access to the Internet among the potential uses of UWB. Conventional wireless technologies use a carrier method of signaling that produces a unique signature characteristic at a unique frequency point (Figure 1). Here, the area under the graph represents signal quality. In the figure, both the conventional approach and **Fantasma's** approach achieve identical signal quality. Unlike these methods, **Fantasma** encodes data in brief pulses and transmits these across a wide frequency band at low power. This technique has the inherent feature of spreading a high bit rate workload across the spectrum, providing for a processing gain on the transceivers. As well, this technique is less susceptible to the reflected interference (multi-path fading) associated with conventional approaches.



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FAQ:

FANTASMA --THE COMPANY

Q1: What is Fantasma Networks, Inc.?

A1: Fantasma Networks is a privately held developer of devices applying Ultra-Wideband (UWB) technologies for wireless home networking. The company was spun off from Interval Research Corporation in January 2000. We completed our \$11.6 million first-round funding with investments from APV Technology Partners, Centennial Ventures, Intel Capital, and Vulcan Ventures, the investment organization of Paul G. Allen.

Q2: Who are Fantasma's principals?

A2: Physicist and inventor Dr. G. Roberto Aiello is Fantasma's President and CEO. Our Chairman is Dr. Ronald E. Foerster, an executive with extensive international experience in the wireless industry. See the Team link for more information on Fantasma personnel.

Q3: Where is Fantasma Networks located?

A3: Our address is 3250 Ash Street, Palo Alto, California 94306. Our telephone number is 877 906 9300, and our fax number is 650 354 8894.

Q4: What does "Fantasma" mean?

A4: Fantasma is Italian for "ghost," a play on words meant to suggest the invisible nature of wireless connections.

FANTASMA -- THE TECHNOLOGY

Q5: What is Ultra-wideband?

A5: UWB is radio transmission that employs very short pulses of radio energy that spread across a very wide range of frequencies.

Q6: Why use UWB?

A6: UWB communication systems can outperform other radio systems that offer only a fraction of the broadband capacity, and, because of their simplicity, they can do so at lower cost. UWB performs especially well indoors, where signal reflections can enhance communication.

Properly designed UWB devices can share the radio spectrum used by conventional radio systems without detection or harmful interference.

Q7: Where will UWB communication be used?

A7: Fantasma UWB products will first be used where their unique attributes—there is no alternative to its capabilities for short-range wireless broadband transmission. Networking in homes and schools, for example, may require simultaneous Internet access, high definition video and CD audio quality, camcorders, game consoles and the like. Other wireless networks for the home cannot provide such a capacity for high-bandwidth applications at data rates of 60 Mbps and more.

Q8: Is UWB a "spread spectrum" technique?

A8: No. UWB signals consist of specially formed and extremely brief pulses. Short pulses naturally spread over a wide radio frequency spectrum. In contrast, a spread spectrum radio transmission typically combines the information to be transmitted with a long code of random numbers, or it may hop from channel to channel.

Q9: Is UWB a new technique?

A9: Heinrich Hertz, the discoverer of electromagnetic waves, generated brief radio pulses in his experiments in the late 1800s. The use of spark discharges that produce UWB signals was fundamental to radio communication for decades. In the 1940s, university and military laboratories focused on the precise control of radio pulses and their use for secure, interference-free communications. The first UWB patent was filed in 1942. Since the 1960s, UWB has been used in ground radar systems that are used to detect buried objects or to inspect the condition of structures such as bridges. The microprocessor era and the emergence of broadband communications made possible an inexpensive, very high capacity wireless indoor network, representing the first mass-market product incorporating UWB technology. Fantasma Networks has pioneered the critical elements necessary to make UWB practical for short range broadband consumer applications. These innovations are protected by U.S. and international patents.

FANTASMA -- THE PRODUCTS

Q10: What are Fantasma's products?

A10: Our products are UWB radio transceivers that will appear principally in the form of chipsets and reference designs which original equipment manufacturers (OEMs) can use to incorporate broadband wireless networking capabilities into consumer electronics devices.

Q11: What is the market for Fantasma's products?

A11: The demand for broadband services is growing rapidly. These services enter the home via media such as DSL, cable modems, satellite dishes and fixed wireless links. Subscribers to these services now face the challenge of connecting computers, peripherals, TVs, stereos and Internet radios, handheld digital assistants, and Internet appliances to the broadband service

provider and to each other. Within the home, Fantasma's technology incorporated in these consumer devices will instantly connect them wirelessly together and to the Net. Increasingly, broadband services will connect first to a residential gateway or home server, which may combine firewall, routing, storage and billing functions. From this central point, Fantasma wireless networking will connect computer and multimedia devices providing data rates that surpass conventional Ethernet cabling or typical wireless networks.

Q12: What is the data rate and communication range of a Fantasma network?

A12: The network will be capable of delivering raw data rates up to 60 megabits per second (Mbps) for distances up to 50 meters. This is the equivalent of two high-definition video streams, five digital audio streams and ten Internet connections -- all at the same time.

Q13: Will there be a charge to use a Fantasma home network?

A13: Other than equipment purchase and electrical power, there is no charge for using the Fantasma wireless network to connect home computing, entertainment, communications and security devices. Service providers, such as cable, telephone, satellite, and Internet companies, may of course charge for their services.

Q14: When will Fantasma's products be available?

A14: Fantasma will ship products within six months after the Federal Communications Commission (FCC) authorizes the use of UWB devices in the frequency range of 2 gigahertz (GHz) and higher.

FANTASMA - USE OF THE RADIO SPECTRUM

Q15: What radio spectrum will Fantasma Networks' products use?

A15: They will operate between approximately 2 GHz and 5 GHz, in the Ultra High Frequency (UHF) and Super High Frequency (SHF) bands. Our products don't use any specific narrow frequency range but instead transmit extremely low power signals spread across the 2-5 GHz range.

Q16: Do Fantasma Networks' products require FCC fees, spectrum allocations, auctions, licensing, regulations, or certification?

A16: Our products don't require spectrum allocations, auctions or licensing. They will share spectrum that already is used for other purposes. Customers won't need FCC licenses or pay FCC fees. But UWB products must be certified (approved for sale) by the FCC.

The FCC must establish UWB regulations first; then it will certify products. Regulatory authorities in other countries have a similar process. FCC approval of UWB in the U.S. will help make this technology accepted around the world.

Q17: Why do you think the FCC will approve UWB?

A17: The FCC has stated its strong interest in UWB adoption. The Commission has stated: "We believe that UWB technology holds promise for a vast array of new or improved devices that could have enormous benefits for public safety, consumers and businesses. ... Such devices could be used to wirelessly distribute services such as phone, cable, and computer networking throughout a building or home. ... We anticipate that UWB technology could create new business opportunities for manufacturers, distributors and vendors that will enhance competition and the economy. UWB technology may also enable increased use of scarce spectrum resources by sharing frequencies with other services without causing interference. ... Accordingly, we conclude that the Commission should develop reasonable regulations that will foster the development of UWB technology while continuing to protect radio services against interference." [Notice of Proposed Rule Making, ET Docket 98-153, May 11, 2000].

The FCC also noted that Federal law requires the Commission to "encourage the provision of new technologies and services to the public." UWB solves several problems in bringing broadband and Internet access to the public. When used as a wireless local-area network, UWB eliminates the need for cabling between computer and multimedia devices, reducing costs, construction, and disruption. It breaks through the purported "spectrum shortage," allowing frequencies to serve enormous numbers of users. Its substantial capacity exceeds that of conventional wireless LAN products. Fantasma products will support other FCC initiatives, such as digital television and fixed wireless Net access, by making these services more easily available to the user.

Q18: What is the FCC doing to enable UWB products to enter the market?

A18: On May 11, 2000, the FCC proposed permitting the sale of UWB products. Its proposal is contained in a Notice of Proposed Rule Making (NPRM), identified as ET Docket 98-153. Public comments on this NPRM are due at the FCC September 12, 2000.

Q19: What issues is the FCC NPRM considering?

A19: The main issue is whether UWB products will cause radio interference to the Global Positioning System (GPS). GPS is the Defense Department's constellation of location-finding satellites. In the NPRM, the FCC stated its belief that UWB "can generally operate in the region above 2 GHz without causing harmful interference to other radio services" and that it is "not proposing any restrictions on UWB devices operating at frequencies above approximately 2 GHz." Fantasma endorses that FCC position and urges the FCC to promptly authorize the use of UWB above 2 GHz, to bring consumers the benefits of UWB home networking. Fantasma has demonstrated that the use of GPS frequencies is not necessary for UWB communications and has publicly committed to operating above 2 GHz, away from GPS frequencies. Fantasma Networks is confident that its UWB technology carries no risk of interference to GPS or other spectrum users. Moreover, Fantasma products can operate in the crowded radio spectrum without significant reduction in performance.

Other issues in the NPRM concern the measurement of UWB signals and related technical questions. Fantasma is working closely with the FCC and other government and corporate interests to resolve the questions raised in the NPRM. We believe that FCC authorization could occur in the first quarter of 2001.

Ultra-Wideband Technology

Technology

Ultra-wideband (UWB) technology holds tremendous promise for the creation of new broadband wireless devices that will allow users to transfer wirelessly large amounts of data over short distances. UWB uses very narrow pulses to send or receive information. These pulses appear to traditional communications receivers as little more than background radio noise, which can allow very low-power UWB transmissions to operate in the background of other radio communications without causing interference.

There are many potential uses for UWB technologies. The military has had access to UWB spectrum for many decades and has used it for numerous wireless devices. Now, as spectrum demands continue to increase, the focus of UWB is shifting to commercial uses. For communications, such as linking video, audio and Internet within a home or school, the potential is limitless.

Fantasma Networks, Inc.

Fantasma Networks, Inc., is an exciting new company based in Palo Alto, CA., which develops innovative UWB technologies for wireless networking in homes, schools, libraries, medical and elderly-care facilities and businesses. Fantasma's technologies will allow simultaneous video, audio, and Internet use to be incorporated into entertainment, computing, communications devices and appliances. These technologies will allow low-cost, easy-to-install broadband access for everyone, thereby ending the "digital divide."

Level of Operation

The majority of UWB communications systems under development involve low-power technologies that operate above 2 GHz. The Federal Communications Commission (FCC) recognizes the significant benefits UWB devices may offer to consumers, businesses and public safety and has tentatively concluded that operation above 2 GHz does not cause harmful interference to other radio services.

Some UWB devices, however, operate in frequencies below 2 GHz, including those used for emergency communications such as the Global Positioning System used by the Federal Aviation Administration's aviation channels. To address this issue, the FCC, in its May 10, 2000 notice of proposed rulemaking (FCC 00-163), has called for further testing of UWB at frequencies below 2 GHz. This testing is being done by the National Telecommunications and Information Administration and other groups. All testing must be submitted to the Commission by October 30, 2000.

Timing

Fantasma, however, has designed its UWB technologies to operate at frequencies **above** 2 GHz, isolated from GPS frequencies. As the FCC rulemaking process continues, quick deployment of UWB technologies that operate above 2 GHz should not be delayed awaiting resolution of the issues presented by UWB below 2 GHz.